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RIPENING PEARS AFTER SHIPMENT: REPORT ON PRELIMINARY INVESTIGATIONS

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RIPENING PEARS AFTER SHIPMENT:
REPORT ON PRELIMINARY INVESTIGATIONS

The objects of this study were: (1) to determine the time required to ripen winter pears to a good edible condition at different temperatures; (2) to determine the feasibility of using the U. S. Department of Agriculture Pressure Tester as a guide to the ripeness of pears that had been removed from cold storage to the ripening room; and (3) to determine the effect of temperatures of 55° F. and 45° on pears that had been partially ripened at 65°.

Pears that are placed on the retail market directly from cold storage are usually dry and hard and must be kept for several days by the consumer before they are fit to eat. The consumer, as a rule, prefers to buy fruit that is ready for immediate use. The dealers on the other hand prefer pears that are firm enough to be handled without bruising.

In this study it was found that pears removed from the ripening room at 6.0 pounds pressure were still firm enough for handling by the wholesalers without bruising, yet would soften to an edible condition within 2 or 3 days. However, the time required for pears to soften to 6.0 pounds pressure varied with different lots, and time could not be used as a reliable guide for removing pears from the ripening room (Fig. 17).

In commercial practice, pears are sometimes removed from the ripening room and subjected to lower temperatures either while they are still in the hands of the wholesalers or during transfer to the retailer. Due to lack of indoor storage facilities, wholesalers generally stack pears and other fruits outside of their stores while awaiting sale to the retailers. As most of the winter pears are marketed during winter months, fruit handled in this manner is usually subjected to low temperatures.

Studies were also made of the effect of holding unripened pears at 45°F. for two and three weeks before transferring them to the 65° ripening room. These studies were not completed due to mechanical difficulties with the refrigeration equipment.

Material and Methods

The present study was conducted from October 1948 to April 1949, the work being done in New York City and Beltsville, Maryland. Different lots of Bosc and Anjou pears were furnished by the Oregon-Washington-California Pear Bureau from commercial carlot shipments as they arrived at the terminal markets in Washington, D. C.; Baltimore, Maryland; and New York City. Pertinent data on each lot will be found in Table 1 and Table 2.

Core temperatures were usually taken on arrival of the car at the terminal market. Firmness was determined by means of the pressure tester equipped with a 5/16" plunger at pared spots on three sides of each fruit. Color was determined by comparison with the U. S. D. A. Standard Ground Color Chart for Apples and Pears in Western States. This chart is graduated into four shades: No. 1 - green, No. 2 - light green, No. 3 - greenish yellow, and No. 4 - yellow.

The following terms and abbreviations were used to describe the condition of the pears at the various sampling dates:

a. Ripeness - Hard (H), Firm (F), Firm Ripe (FR), Ripe (R), or Overripe (OR).

b. Texture - Woody, Crisp, Mellow, Soft, Very Soft, or Mealy.

c. Juiciness - Lacking, Juicy or Watery.

d. Flavor - Lacking, Mild, Full, or Flat.

Internal breakdown was recorded as Slight, Moderate or Severe. The area in which the breakdown occurred was also noted.

Upon receipt of each new lot at Beltsville, Md., a sample of ten pears of each size was examined. Pressure test readings were made, ground color was recorded and the fruit tasted for ripeness, texture, juiciness, flavor, and dessert quality. Twenty to 25 pears of each size were placed in 45°F. and 55° storage and the remaining pears were placed in a ripening room maintained at 65° and 85 percent humidity. Usually after one, two, and four days at 65° the pears were sampled and transfers made to 45° and 55°. At intervals thereafter, the fruit from each temperature was sampled. The length of the interval between sampling depended on the rate of ripening. When samples of any treatment showed approximately 50 percent breakdown, all pears of that treatment were removed from storage and counts made of the sound and broken down fruit. At New York City the same procedure was generally followed except that; (1) ground color was not recorded, (2) in practically all cases the tests were ended after 10 days, (3) the temperature of the ripening room was generally 68° and the humidity around 75 percent.

It should be noted that each lot of pears consisted of not more than two boxes in New York City and six boxes in Beltsville, Maryland. These boxes were placed in the ripening room with lids removed and an air space between all boxes. This enabled the fruit to warm up faster than a carload lot would when held at the same temperature. The small samples of 20 to 25 pears of each size transferred to 45° and 55°F. storage, also reached the desired temperatures more rapidly than had they been held in lidded boxes.

Due to various difficulties, all lots were nottransferred at 1, 2, and 4 days to 55°F. and 45°. This accounts for only 12 or 13 lots being considered for certain temperature combinations in the Beltsville, Maryland, Anjou tests. As only small numbers of pears were used in the transfers only 6 or 7 examinations were possible for each temperature combination. However, the pear samples usually lasted long enough to carry them through to prime eating quality and the beginning of internal breakdown.

Observations and Results

All charts (Figures 1 to 17) are presented as averages of the different lots with part of the text based on them. As this is a preliminary report, data on individual lots are not presented in detail, but are used as a basis for statements made in the text.

Bosc - New York City. — Eight lots of Bosc pears were held in a ripening room at 68°F. Five of these were transferred to 55° and 45° immediately and after 1, 2 and 4 days in the ripening room. The average softening of these5lots is shown in Figure 1.

When held at 68°F. continuously, the pears softened to 6.0 pounds on an average of 3-1/2 to 4 days (Fig. 1). They were edible, but slightly crisp, at a pressure test of 3 to 4 pounds after 7 days. Best eating condition was attained below 3 pounds pressure, reached after 7 to 10 days (Table 3).

At 55°F. continuously, the pears required an average of 5-1/2 to 6 days to soften to 6.0 pounds which was reached at 68°, in 3-1/2 to 4 days (Fig. 1). Pears at 55° showed more shrivelled stem ends than those of the same firmness in the 68° room. This may have been due to the longer period required to reach ripeness or possibly to lower humidity.

At 45°F. continuously, the fruit failed to soften appreciably even when held as long as 18 days. However, the grittiness often disappeared while the fruit was still firm, one lot showing little grit at 7.9 pounds pressure test. This was not observed in pears held at 55° and 68°. Stem ends seemed to shrivel more at 45° than at 55° or 68°.

When held only 1 day at 68°F. and then kept at 55°, the pears became moderately juicy at 7.0 pounds pressure which was reached in about 5 days. They were of good eating quality at 4 pounds pressure which was reached in about 8 days, and better still after 10 days when the pressure was about 3 pounds.

When held 1 day at 68°F. and then kept at 45°, none of the lots became edible within 10 days after arrival. Some shrivelling and occasional internal breakdown was noted.

When held for 2 days at 68°F. and then kept at 55°, the eating quality was good at 4.5 pounds pressure which was reached in about 7 days. Some shrivelling was noted at about 3.0 pounds pressure which was reached after 10 days.

When held at 68°F. for 2 days and then kept at 45°, the pears became fairly edible at 6.0 pounds pressure test after 10 days. Best eating quality developed when the fruit had softened to 4 pounds pressure or less. Much shrivelling of stem ends was observed.

When held 4 days at 68°F. and then kept at 55°, the pears developed best dessert quality at 3.0 pounds pressure test or below. They softened to this point in about 10 days. Some shrivelling and occasional internal breakdown was observed after 10 days at 55°.

When held 4 days at 68°F. and then at 45°, the pears had good eating quality at 4.0 pounds pressure test. Shrivelling at the stem ends and core discoloration started in about 10 days.

The rate of ripening at the different temperatures was determined on the basis of the pounds softening per day to reach 6.0 pounds at each temperature except 45° at which temperature the pears did not always reach 6.0 pounds, particularly in the lots at New York City that were held for only 10 days. On this basis the pears softened at the rates of 1.35, 0.88 and 0.08 pounds per day at 68°, 55° and 45°, respectively. Expressed another way, the pears ripened about 50 percent faster at 68° than at 55° and 11 times faster at 55° than at 45°.

These tests indicated that the Bosc pears became edible when they softened to 6.0 pounds or below. The time required to reach this firmness varied with the temperature at which the pears were held. It appears that one or two days in the ripening room was not long enough to soften the pears enough so that they would reach the consumer in good edible condition under normal marketing conditions.

The market condition of different lots of Bosc pears after different lengths storage at 68°F. are shown in Table 3. These data indicate the variations that may be expected between different commercial lots of fruit.

Softening of the 3 lots received between October 26, 1948 and November 8, 1948 is shown in Figure 2 and of the last 2 lots received between November 15, 1948 and December 6, 1948 in Figure 3. The latter 2 lots were firmer on arrival and softened more rapidly. These differences are probably due to inherent differences in the fruit from different sources rather than to time of arrival on the market, since, with comparable fruit, that received later in the season would normally be softer (except with lots that have lost their ripening capacity).

Bosc - Beltsville, Maryland — Six lots of Bosc pears were placed at 65°F. for ripening and transferred at intervals to 55° and 45°. Average softening when held continuously at each of these temperatures is shown in Figure 4. Softening at 55° and 45° after different intervals in the ripening room (65°) is shown in Figure 5.

In these tests it was found that at a pressure test of about 6.0 pounds the fruit was in a good condition for removal from the ripening room for wholesale marketing. At this stage in the ripening process the fruit was still firm enough for handling without excessive bruising, but soft enough to complete the ripening in 2 to 3 days to a point where it was suitable for eating. Fruit with a pressure test of about 4-4.5 pounds was satisfactory for eating although still somewhat firm. Prime eating condition with full development of juice and aroma did not develop until the fruit softened below 4.0 pounds pressure.

The average pressure test readings for 6 tests of fruit held continuously at 65°F., 55° and 45° are shown in Figure 4 and those for the fruit held at 55° and 45° after different intervals at 65° are shown in Figure 5.

At 65°F. continuously, these pears softened to 6.0 pounds pressure in 5 days. At this time they were suitable for wholesale marketing. They reached best eating quality at an average pressure of about 4 pounds after about 7 days. The pears became very soft and started to show internal breakdown after 11 to 14 days at this temperature (Table 4).

At 55°F. these pears softened to 6.0 pounds pressure test in about 7 days. They were of best eating quality at 3.7 pounds pressure which was reached after 12 days. After 14 days they generally became overripe.

When held at 45°F. pears softened to 6.0 pounds pressure test after 15 days. They were of best eating quality at 4.8 pounds pressure test, reached after 20 days.

The average rate of softening at 65°, 55° and 45° (to 6 pounds pressure test) was 1.18, 0.87 and 0.39 pounds per day, respectively. Using this as a measure of ripening rate the Bosc pear ripened 36 percent faster at 65° than at 55° and 123 percent faster at 55° than at 45°.

Pears held for 1 day at the ripening temperature of 65°F. did not soften and in some lots showed a higher pressure test than when first placed in the ripening room (Fig. 4). When removed from the ripening room after 1 day, pears required an additional 7 days at 65°, 11 days at 55°, and 19 days at 45° to reach their best eating condition. These pears remained in good eating condition after 13 days at 65°, 14 days at 55°, and 21 days at 45°.

Pears held in the ripening room for 2 days required an additional 6 days at 65°F., 7 days at 55° and 15 days at 45° to reach their best eating condition. They remained in good eating condition for 12 days at 65°, 14 days at 55°, and 20 days at 45°.

Pears held in the ripening room for 4 days required in addition, an average of 4 days at 65°F., 5 days at 55°, and 10 days at 45° to reach their best eating condition. These pears remained in good eating condition for 10 days at 65°, 13 days at 55°, and 18 days at 45°.

Softening of the first 3 lots received between October 1, 1948 and November 15, 1948 is shown in figure 6 and softening of the last 3 lots received between November 16, 1948 and December 15, 1948 is shown in figure 7. There does not seem to be any significant difference in the way the fruit softened and ripened between lots of pears received during these different periods of the marketing season.

From these results it appears that the pressure tester can be used as a guide in determining the ripeness of Bosc pears for commercial handling. When these pears softened to 6.0 pounds pressure test, they were ready for removal from the ripening room into wholesale marketing channels. The best eating quality came below 4.0 pounds pressure. These figures seem to apply to all temperatures and temperature combinations used in these investigations. It also appears that 4 days at the ripening temperature of 65°F. is generally long enough for pears similar to those used in this test. Pears held at 65° for only 1 or 2 days were slow in reaching their best eating condition, and did not soften sufficiently during the time the wholesaler would normally want to hold them. Pears held continuously at 65° remained edible for about 14 days after being placed in the ripening room.

Anjou - New York City. — Nine lots of Anjou pears were placed at 68°F. for ripening and 7 of these were transferred at intervals of 1, 2 and 4 days to 55° and 45°. Average softening of the 7 lots is shown in Figure 8.

Pears held at 68°F. continuously, softened to 6.0 pounds pressure in an average of 4-1/2 days. At this time they were suitable for removal from the ripening room. The best dessert quality occurred at an average pressure test of 3.0 pounds or below which was reached in 7 days.

At 55°F. continuously, these pears softened to 6.0 pounds pressure test in about 6-1/2 days. They were best for eating at 3.0 pounds or less pressure test, which was reached in 10 days.

Pears held at 45°F. continuously, only softened from an average pressure test of 13.9 pounds to an average pressure test of 12.2 pounds in 10 days.

The rate of softening (to 6 pounds) at the different temperatures was 1.75, 1.18 and 0.17 pounds per day at 68°, 55° and 45° respectively. On this basis the ripening rate was only 48 percent faster at 68° than at 55° but nearly 600 percent faster at 55° than at 45°.

When the average pressure test of these pears dropped to about 6.0 pounds, they were in good condition for removal from the 68°F. ripening room for wholesale marketing. At this stage in the ripening process the fruit was firm enough for handling without excessive bruising, but soft enough to complete the ripening in 2 to 3 days. Prime eating condition with full development of juice and flavor did not occur until the fruit softened below 3.5 pounds pressure test.

Pears held in the ripening room for one day only softened from an average pressure test of 13.9 to 13.2 pounds. They required an additional 6 days at 68°F. or 8 days at 55° to reach their best eating condition. Pears transferred to 45° after 1 day in the ripening room softened only to an average of 10.8 pounds pressure in 10 days.

Pears held in the ripening room for 2 days required an additional 5 days at 68°F. or 7 days at 55° to reach their best eating condition. Pears transferred to 45° had only softened to an average of 8.1 pounds pressure test after 10 days.

Pears held in the ripening room for 4 days required an additional 3 days at 68°F. or 4 days at 55° to reach their best dessert quality. When placed at 45° after 4 days at 68°, pears softened to 5.0 pounds pressure test in about 3 days, but were only of fair eating quality. After 10 days they had softened to an average pressure test of 4.4 pounds but still were not of best dessert quality.

The average softening of 4 lots received early in the season between November 29, 1948 and December 6, 1948 is shown in Figure 9 and of 3 lots received late in the season, between January 3, 1948 and January 10, 1948, in Figure 10. The results do not show any significant difference in softening and ripening that could be attributed to time of arrival on the market.

Anjou - Beltsville, Maryland. — Fourteen lots of Anjou pears were placed in a 65°F. ripening room and part of these were transferred at intervals of 1, 2 and 4 days to 55° and 45°. The rate of softening when held continuously at 65°, 55° and 45° is shown in Figure 11. The rate of softening at 55° and 45° following different periods at 65° is shown in Figure 12.

There was no significant difference observed between the softening of pears received early in the season and those received later on (Figs. 13, 14, 15, and 16). However, it was noted that the degree of firmness on arrival affected the length of time these pears required to soften to 6.0 pounds pressure test. The 14 lots were divided into 3 groups on the basis of average initial pressure tests: group 1, lots below 10.5 pounds pressure test; group 2, lots between 10.5 and 12.0 pounds pressure test; group 3, lots 12.0 pounds pressure test and over. Figure 17 shows the average softening at 65°F. for the 3 groups.

At 65°F. continuously, the pears softened to 6.0 pounds pressure test in 3 to 5 days, depending on the initial pressure test (Fig. 17). They were of best eating quality at about 3.5 pounds or less pressure test which was reached after 7 days. After 15 days the pears were generally overripe or too soft for retail sales (Table 6).

At 55°F. continuously, the pears softened to 6.0 pounds pressure test in about 7 days. These pears were still of good dessert quality after 20 days.

At 45°F. continuously, the pears softened to 6.0 pounds pressure test after 13 days. These pears maintained good dessert quality after more than 21 days.

The average rate of softening (to 6 pounds) was 1.34, 0.80 and 0.45 pounds per day at 65°, 55° and 45°F., respectively. On this basis the rate of ripening was 68 percent faster at 65° than at 55° and 78 percent faster at 55° than at 45°. The increase in the rate of ripening with temperature was about the same between 65° and 55° in lots of both Bosc and Anjou held at New York and Beltsville but between 55° and 45° the difference was much greater in lots held at New York than in those held at Beltsville. The reason for this has not been determined.

Pears held in the ripening room for 1 day required an additional 6 days at 65°F., 10 days at 55°, and 17 days at 45° to reach their best eating quality. These pears remained in good eating condition for 14 days at 65°, 20 days at 55°, and 28 days at 45°.

When held in the ripening room for 2 days, pears required an additional 5 days at 65°F., 9 days at 55°, and 16 days at 45° to reach their best eating condition. They remained in good eating condition for 13 days at 65°, 19 days at 55°, and 26 days at 45°.

Pears held in the ripening room for 4 days required an additional 3 days at 65°F., 5 days at 55°, and 10 days at 45° to reach their best eating quality. They remained in good eating condition for 11 days at 65°, 17 days at 55°, and 22 days at 45°.

In the 14 lots of Anjou pears it was noted that the larger fruit generally softened slightly faster and was of higher quality than the smaller sized fruit. As both sizes were being ripened under identical conditions, it is possible that the smaller size pears might have been less mature when picked than the larger size pears. This difference in time of ripening and in quality between sizes was not noted in the 6 lots of Bosc pears.

Several lots of Anjou's became flat and mealy instead of ripening with good quality. This was most evident in a few lots shipped late in the storage season. However, in general there was no significant difference in quality between lots received early and those received late in the season as some of the latter developed very good flavor when ripened.

These Anjou pears usually did not become yellow until they had reached prime eating condition or were slightly past prime. Some lots attained a greater degree of yellow than others, the reason for which was not determined.

Conclusions

From results of the present studies it appears that the U. S. D. A. pressure tester equipped with a 5/16" plunger can be used to determine when the pears have become soft enough to be removed from the ripening room and placed on the wholesale market. The pears were generally sufficiently firm for handling when softened to 6.0 pounds pressure test. After softening to this pressure they required 2 or more days to reach good eating quality. After they became ripe, they remained in satisfactory condition without breakdown at 65°F. for about 10 days. Being ripe, however, such pears would require careful handling to avoid bruising.

The results so far indicate that 36 hours in a 65°F. ripening room is not long enough to soften pears to a suitable condition for wholesale handling. The pears usually softened sufficiently in 4 days at 65° to reach prime eating condition 2 to 3 days later, and usually were not too soft for wholesale and retail handling.

Acknowledgments

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Table No. 1 — Pears Used for Pear Ripening Investigations.
October, 1948 to March, 1949 - Beltsville, Maryland

Variety	Lot No.	No. of boxes and size		Source	Arrival date	Brand	Grade	Core. Temp. on arrival	Pressure test on arrival (pounds)	Days to reach 6.0 pounds at 65°	Remarks
Anjou	1	2-110	2-150	Placerville, Calif.	10/11/48	Gem	- - - -	45°F.	12.8	5-1/2	
Anjou	2	3-100	2-150	Yakima, Wash.	10/26/48	Moon	Fancy	45°F.	12.8	4-1/2	
Anjou	3	3-100	2-150	Medford, Ore.	11/15/48	Pic O Pac	Fancy	40°F.	11.9	3-1/2	
Anjou	4	3-100	2-135	Hood River, Ore.	11/19/48	Red Diamond Blue "	Fancy U.S. No.1	45°F.	14.6	5	Stored at 31°F. until 11/22/48 before pressure testing.
Anjou	5	3-100	2-135	Hood River, Ore.	12/6/48	Blue Diamond	U.S.No. 1	46°F.	11.7	3-1/2	
Anjou	6	3-100	2-150	Wenatchee, Wash.	12/13/48	4 Star	Fancy	42°F.	13.4	5-1/2	
Anjou	7	3-100	2-150	Yakima, Wash.	1/17/49	Snow Owl	Fancy	- -	9.5	2-1/2	Bottom layer frozen on arrival Baltimore, Md.
Anjou	8	3-80	2-120	Hood River, Ore.	1/17/49	Blue Diamond	U.S.No. 1	- -	14.8	5	
Anjou	9	3-100	2-150	Yakima, Wash.	2/7/49	Blue Ribbon	Ex. Fancy	45°F.	8.7	3	
Anjou	10	3-100	2-150	Medford, Ore.	2/9/49	Pic O Pac	Fancy	- -	10.4	3	
Anjou	11	4-100	2-135	Hood River, Ore.	2/23/49	Blue Diamond	U.S.No. 1	42°F.	14.0	4	
Anjou	12	4-100	2-135	Yakima, Wash.	2/28/49	Violet	Ex. Fancy	45-47°F.	11.4	4	
Anjou	13	4-100	2-150	Hood River, Ore.	3/7/49	Blue Goose	U.S.No. 1	43°F.	11.9	5-1/2	Moderate shrivelling mainly in size 100.
Anjou	14	4-100	2-150	Medford, Ore.	3/14/49	Pic O Pac	Fancy	- -	8.0	3	Considerable decay noted on arrival
Bosc	1	2-100	2-150	Placerville, Calif.	10/4/48	Gem	- - -	35°F.	14.0	5-1/2	
Bosc	2	2-100	2-150	Yakima, Wash.	10/18/48	Tulip	- - -	- -	11.8	4	
Bosc	3	3-100	2-150	Medford, Ore.	11/1/48	Pinacle	U.S.No. 1	44°F.	8.5	3	Considerable bruising and cutting in boxes.
Bosc	4	3-70	2-100	Hood River, Ore.	11/19/48	Webster	U.S.No. 1	46°F.	12.4	5	Stored at 31°F. to 11/22/48 before pressure testing
Bosc	5	3-100	2-150	Hood River, Ore.	12/6/48	Blue Diamond	U.S.No. 1	43°F.	11.7	4-1/2	
Bosc	6	3-100	2-150	Medford, Ore.	12/13/48	Pic O Pac	Fancy	42°F.	12.5	4	Much decay developed in this lot.

Table No. 2 - Pears Used for Pear Ripening Investigations - October, 1948 to January, 1949
New York City

Variety	Lot No.	Source	Starting Date	No. & Size	Brand	Grade	Pressure test on arrival (pounds)	Days to reach 6.0 pounds at 68°F.	Remarks
Anjou	1	Cashmere, Wash.	10/11/48	1-150	Hy Tone	Ex. Fancy	10.7	4-1/2	
Anjou	2	Wenatchee, Wash.	10/18/48	1-150	Twin W	Ex. Fancy	12.7	5-1/2	
Anjou	3	Hood River, Ore.	11/29/48	2-150	Blue Diamond	U.S.No.1	14.4	3-1/2	
Anjou	4	Medford, Ore.	11/29/48	2-150	Old Gold	Fancy	13.8	5	
Anjou	5	Hood River, Ore.	12/6/48	2-150	Mt. Hood	U.S.No.1	15.6	5-1/2	
Anjou	6	Medford, Ore.	12/6/48	1-150	Farm Belle	Unclassified	13.2	4-1/2	
Anjou	7	Hood River, Ore.	1/3/49	2-135	Red Diamond	Fancy	15.8	5-1/2	
Anjou	8	Medford, Ore.	1/3/49	2-150	Rogue	Fancy	11.9	3-1/2	
Anjou	9	Hood River, Ore.	1/10/49	2-150	Red Diamond	Fancy	12.7	3	
Bosc	1	Rogue River Valley Medford, Ore.	10/11/48	1-150	Trader	U.S.No.1	12.7	3	
Bosc	2	Yakima, Wash.	10/18/48	1-150	Big Y	U.S.No.1	13.3	4	
Bosc	3	Medford, Ore.	10/18/48	1-150	Trader	U.S.No.1	11.8	3-1/2	
Bosc	4	Medford, Ore.	10/26/48	2-150	Trader	U.S.No.1	11.8	4-1/2	
Bosc	5	Hood River, Ore.	11/8/48	2-100	Blue Diamond	U.S.No.1	9.9	3-1/2	
Bosc	6	Medford, Ore.	11/8/48	2-150	Pinnacle	U.S.No.1	8.7	1-1/2	8% decay in test boxes on arrival
Bosc	7	Medford, Ore.	11/15/48	2-150	Mountain A (Blue Goose)	Fancy	12.4	4	
Bosc	8	Medford, Ore.	12/6/48	2-150	Rogue	U.S.No.1	12.2	4	

Table No. 3 - Condition of different lots of Bosc pears at different stages of ripeness when held at 68°F. A-Stage suitable for wholesale marketing; B-Stage suitable for retail marketing; C-Optimum dessert quality; D-Beginning of breakdown. New York - 1948

Lot No.		Days	Average Pressure Test	Remarks
	A	3	6.6	Dry
	B	4	4.7	Juicy and edible - Right for a retail store
1	C	7	3.8	Too soft for hauling or prepackaging. Good for retail sales. Better than above for eating.
	D	10	3.0	Very juicy - start of internal breakdown.
	A	4	5.5	Slight ripeness
2	D	7	3.2	Very juicy - good edibility - fresh appearance. Last day to keep in retail store - start of internal breakdown
	A	3	6.6	Slight edibility and medium juiciness.
3	D	7	3.1	Very juicy - good edibility - fresh appearance. Last day to keep in retail store - start of internal breakdown.
	A	3	7.7	Signs of ripeness.
4	B	6	3.7	Slight crispness or grittiness.
	C	8	3.4	Not yet fully soft.
	A	4	5.0	Good edibility - slightly crisp.
5	C	7	3.4	Juicy - not fully soft.
	A	2	5.4	Pears showing pressures of 4.0 to 5.0 very juicy, sweet, excellent eating, few soft - Others crisp but edible.
6	B	4	4.7	Slightly crisp - good eating.
	C	7	4.2	Crisp to soft - good eating - heavy decay.
	A	7	4.2	Good eating - not too soft - Good appearance.
7	C	9	3.0	Juicy - best for eating.
	A	4	5.6	Good flavor. Fairly good eating - slightly crisp - moderately juicy.
8	B	7	3.9	Better eating and juicier than above. Sl. crisp.
	C	10	3.0	Good eating - right for retail sales.

Table No. 4 - Condition of different lots of Bosc pears at three stages of ripeness when held at 65° F. A-Stage suitable for wholesale marketing; B-Stage suitable for retail marketing or optimum dessert quality; C-Past prime eating condition and beginning of breakdown. Beltsville, Md. - 1948-49

Lot No.		Days at 65° F.	Pressure Test (Pounds)	Ripeness 1/	Flavor	Remarks
1	A	6	4.8	FR - R	Flat & Lacking	
	B	8	3.9	R	Mild to Sl. Lacking	Sl. Mealy
	C	18	---	OR	---	Breakdown
2	A	4	6.0	FR	Flat	
	B	7	3.9	R	Mild	
	C	16	---		Past Prime	Breakdown
3	A	2	7.8	F - FR	---	
	B	7	3.5	R	Full	Prime
	C	11	---	---	Flat-Past Prime	Breakdown
4	A	4	7.0	F	---	
	B	7	3.9	R	Mild to Lacking	
	C	11	---	R - OR	Mild to Lacking	Sl. Mealy
5	A	7	4.6	FR - R	Mild to Sl. Lacking	
	B	11	4.0	R	Sl. mild to Full	
	C	14	---	R - OR	Lacking to Flat	
6	A	4	5.7	F - FR	Mild	
	B	7	4.4	R	Mild to Full	
	C	18	---	OR	Mild to Flat	Breakdown

1/ Abbreviations - Ripeness: F - Firm; FR - Firm Ripe; R - Ripe; OR - Overripe.

A letter that is underlined more nearly describes the condition than the others in the combination, as FR-R means firm ripe to ripe, mostly ripe.

Table No. 5 - Condition of different lots of Anjou pears at 2 or 3 stages of ripeness when held at 68° F. A-Stage suitable for wholesale marketing; B-Stage suitable for retail marketing and consumption: C-Optimum dessert quality. New York - 1948

Lot No.		Days at 68° F.	Average Pressure Test	Remarks
	A	6	8.9	Not edible - Good for prepackaging.
1	C	9	3.5	Could not be prepacked and hauled. Excellent for immediate eating.
	A	4	9.3	Too hard and dry to eat.
2	C	7	3.4	Juicy and good edibility.
	A	4	5.2	
3	C	10	3.0	Juicy, soft, excellent for eating.
	A	4	8.1	
4	C	7	3.0	Soft and fairly juicy.
	A	4	8.2	Hard and dry showing no ripeness.
5	B	7	3.4	Slight crispness - possible to handle in wholesale.
	C	10	3.0	Right for eating and retail.
	A	4	6.6	Dry and inedible.
6	B	7	3.3	Juicy and good eating.
	C	10	3.0	Best condition.
	A	4	9.3	
7	C	7	3.0	Too soft for hauling - Juicy, excellent eating and good for retail sale.
	A	3	7.8	Slight edibility.
8	B	4	4.0	Slightly crisp.
	C	7	3.0	Best condition.
	A	3	5.5	Can still be trucked.
	B	4	5.0	Softer ones 3.5 to 5.0, good to fair dessert quality. Others not edible. Juicy.
9	C	7	3.0	Excellent dessert quality. Very juicy - fresh appearance

Table No. 6 — Condition of different lots of Anjou pears at three stages of ripeness when held at 65°F. A-Stage suitable for wholesale marketing; B-Stage suitable for retail marketing or optimum dessert quality; C-Past prime eating condition and beginning of breakdown. Beltsville, Maryland - 1948-49.

Lot No.		Days at 65° F.	Pressure Test (pounds)	Ripeness[1]	Flavor	Remarks
1	A	6	5.4	F - FR	---	
	B	8	---	FR - R	---	
	C	21+	---	---	---	
2	A	6	4.0	FR - R	---	
	B	8	3.5	R	Tart - Spicy	
	C	21	---	R - OR	Past Prime	Becoming Mealy
3	A	4	4.9	FR	---	
	B	7	3.5	R	Sweet & Spicy	
	C	16	---	R - OR	Full to Sl. Lacking	
4	A	4	7.4	F - FR	Lacking	
	B	7	3.7	R	Mild	
	C	11	---	R - OR	Flat	Becoming Mealy
5	A	4	5.0	F - FR	Sl. Lacking to Mild	
	B	7	3.5	R	Mild to Full	
	C	14	---	R - OR	Flat	Mealy
6	A	7	4.4	FR - R	Lacking to Mild	
	B	9	3.5	R	Mild to Sl. Astringent	
	C	16	---	R - OR	Mild to Astringent	Watery
7	A	4	4.2	FR - R	Sl. Lacking - Mild	
	B	7	3.4	FR - R	Mildly Astringent	
	C	14	---	R - OR	Mildly Astringent	Breakdown
8	A	7	4.1	FR - R	Lacking to Mild	
	B	9	3.3	R	Mild	
	C	16	---	R - OR	Mild to Flat	Breakdown
9	A	4	5.2	FR - R	Lacking	
	B	7	3.6	R	Lacking to Flat	Mealy
	C	11	---	R - OR	Lacking to Flat	Mealy
10	A	5	3.9	FR - R	Mild	
	B	7	3.3	R	Mild	Sl. Mealy
	C	21	---	R - OR	Past Prime	Breakdown
11	A	4+	5.8	F - FR	Lacking	
	B	7	3.3	R	Mild	
	C	16	---	R - OR	Full to Lacking	
12	A	4	6.2	F - FR	Lacking	
	B	7	3.8	FR - R	Mild	
	C	14	---	R - OR	Flat	Mealy
13	A	4	7.6	F - FR	Lacking	
	B	7	3.9	FR - R	Lacking to Flat	
	C	16	---	R - OR	Mild to Flat	Mealy
14	A	1	8.0	F - FR	Mild to Lacking	
	B	4	5.3	FR	Mildly Astringent	
	C	9	3.6	R - OR	Mildly Astringent to Flat	

1 - Abbreviations - Ripeness: F - Firm; FR - Firm Ripe; R - Ripe; OR - Overripe. A letter that is underlined more nearly describes the condition than the others in the combination, as FR-R means firm ripe to ripe mostly ripe.

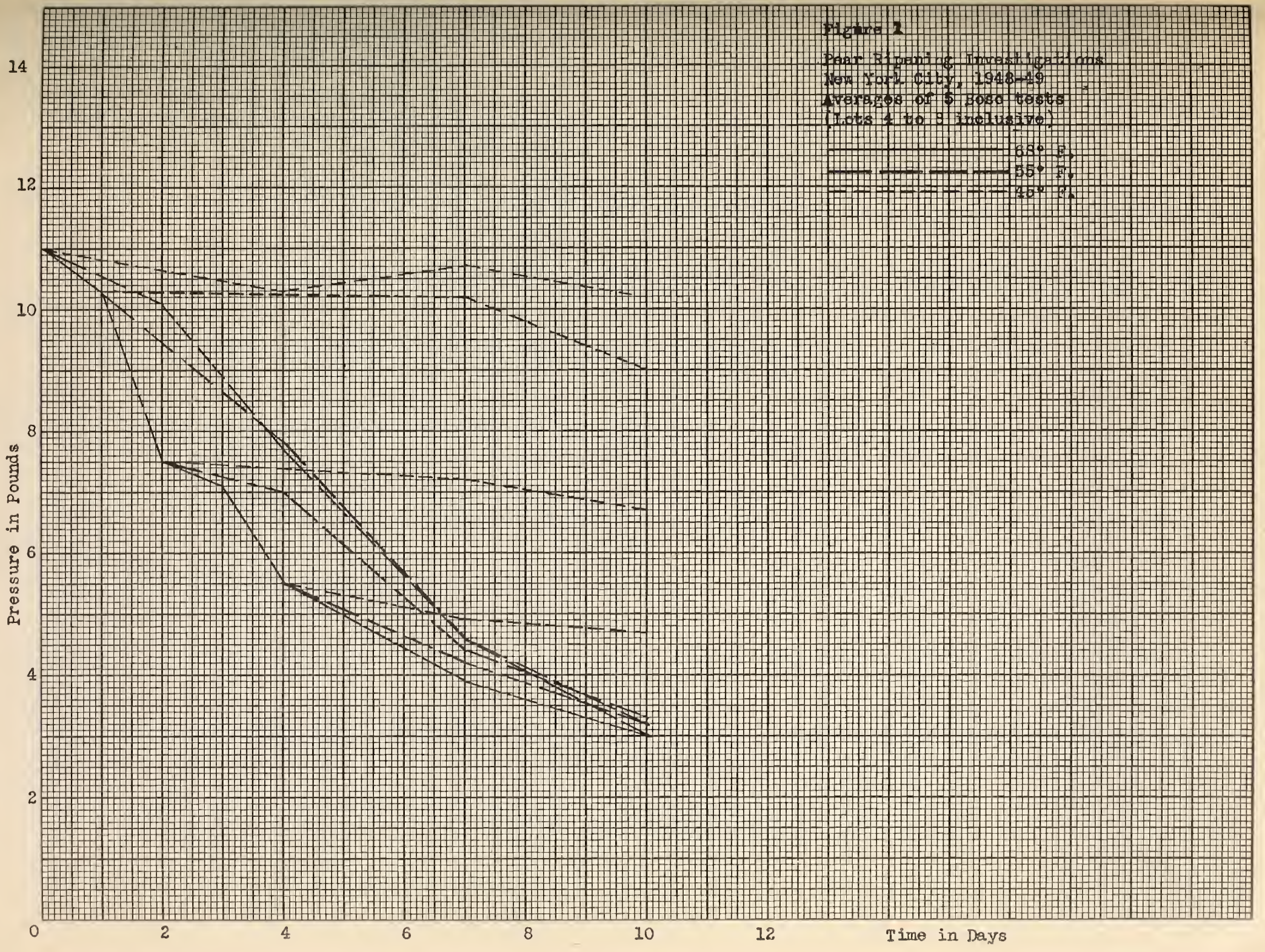
Figure 2
Pear Ripening Investigations
New York City, 1948-49
Averages of 5 Bosc tests
(Lots 1 to 5 inclusive)
68° F.
55° F.
45° F.
Pressure in Pounds
0
2
4
6
8
10
12
14
Time in Days

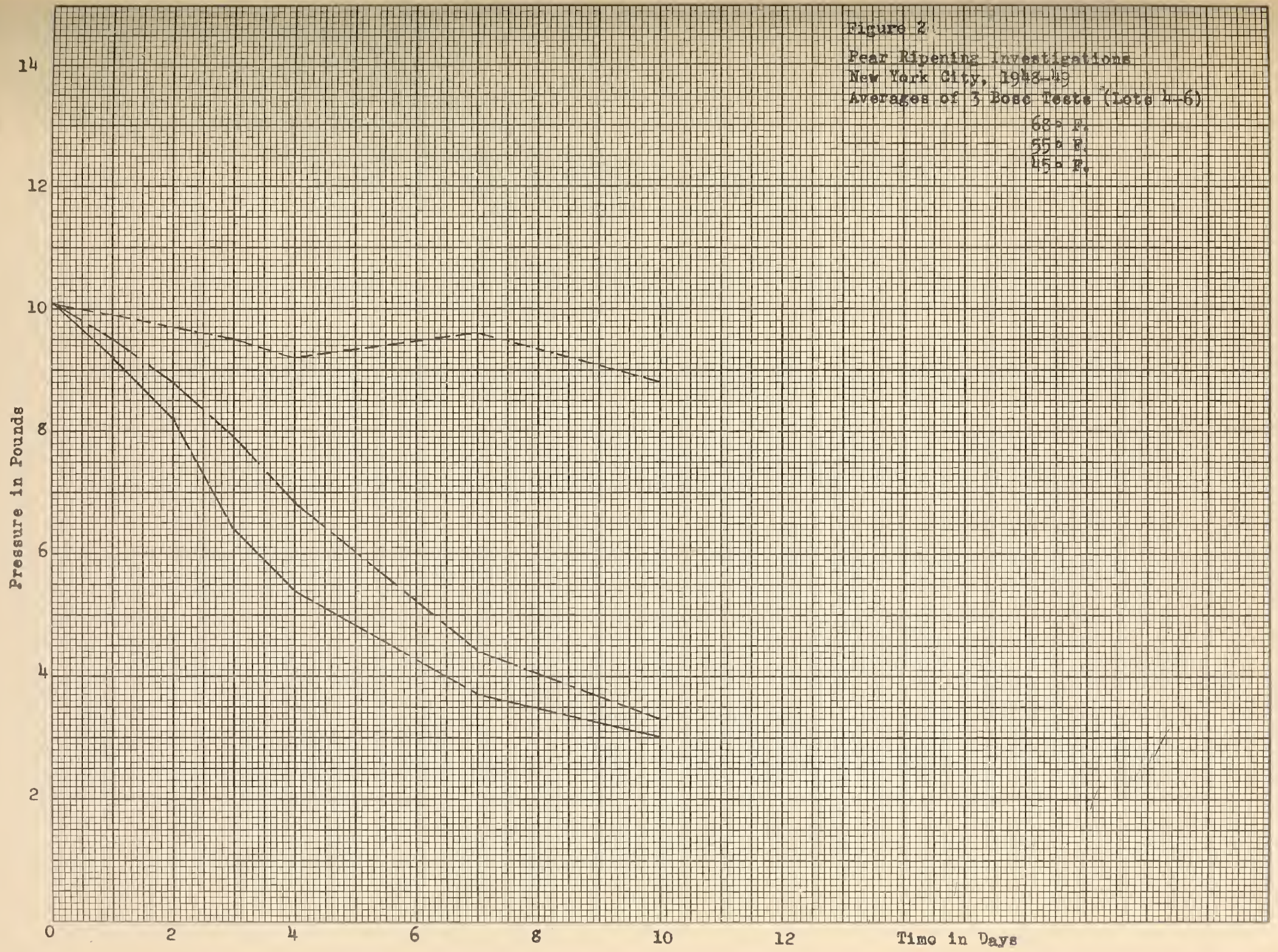
Figure 2
Pear Ripening Investigations
New York City, 1948-49
Averages of 3 Bosc Tests (Lots 4-6)
68° F.
55° F.
45° F.
Pressure in Pounds
14
12
10
8
6
4
2
0
2
4
6
8
10
12
Time in Days

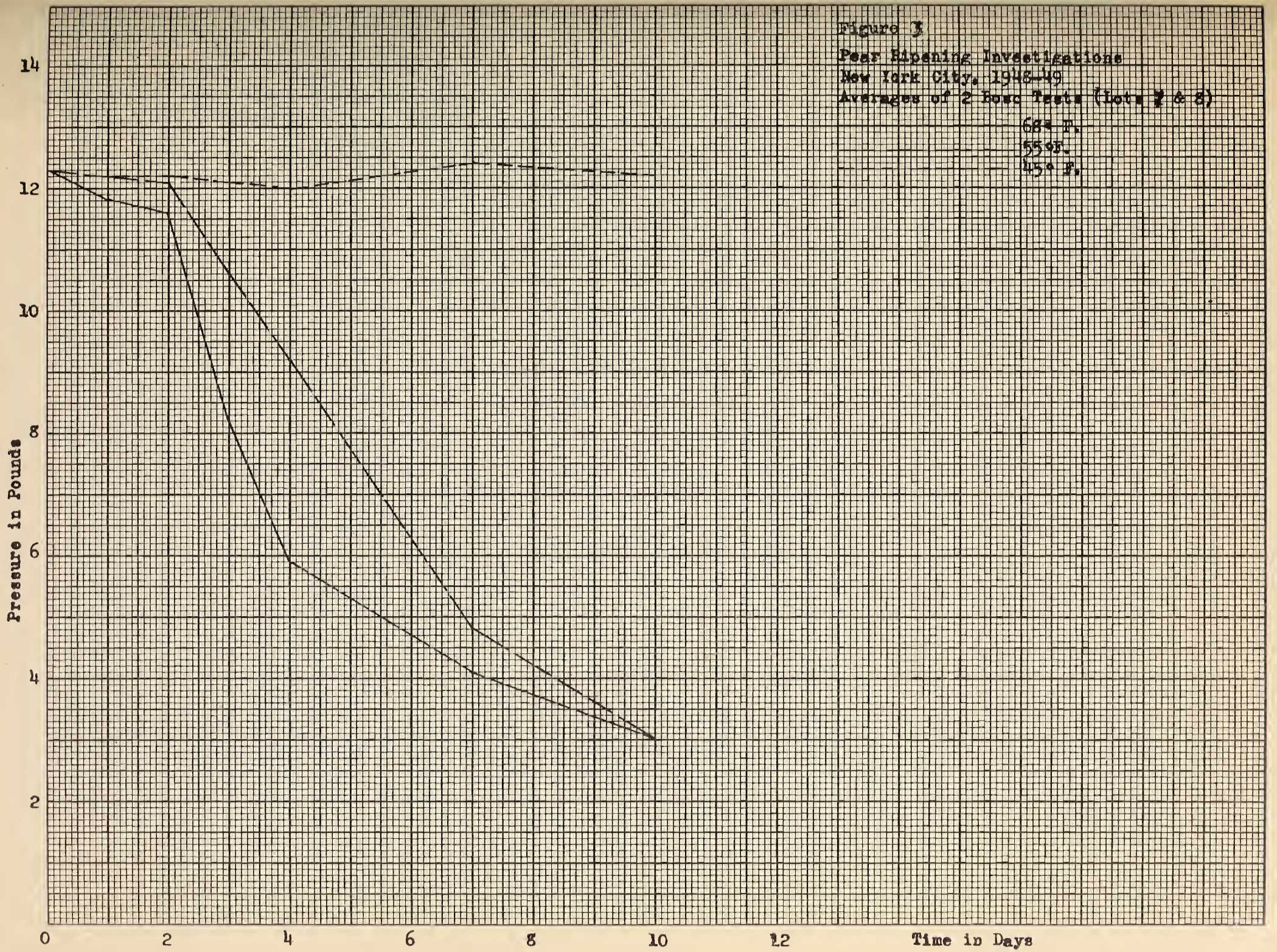
Figure 3
Pear Ripening Investigations
New York City, 1948-49
Averages of 2 Box Tests (Lots 7 & 8)
68° F.
55°F.
45° F.
Pressure in Pounds
14
12
10
8
6
4
2
0
2
4
6
8
10
12
Time in Days

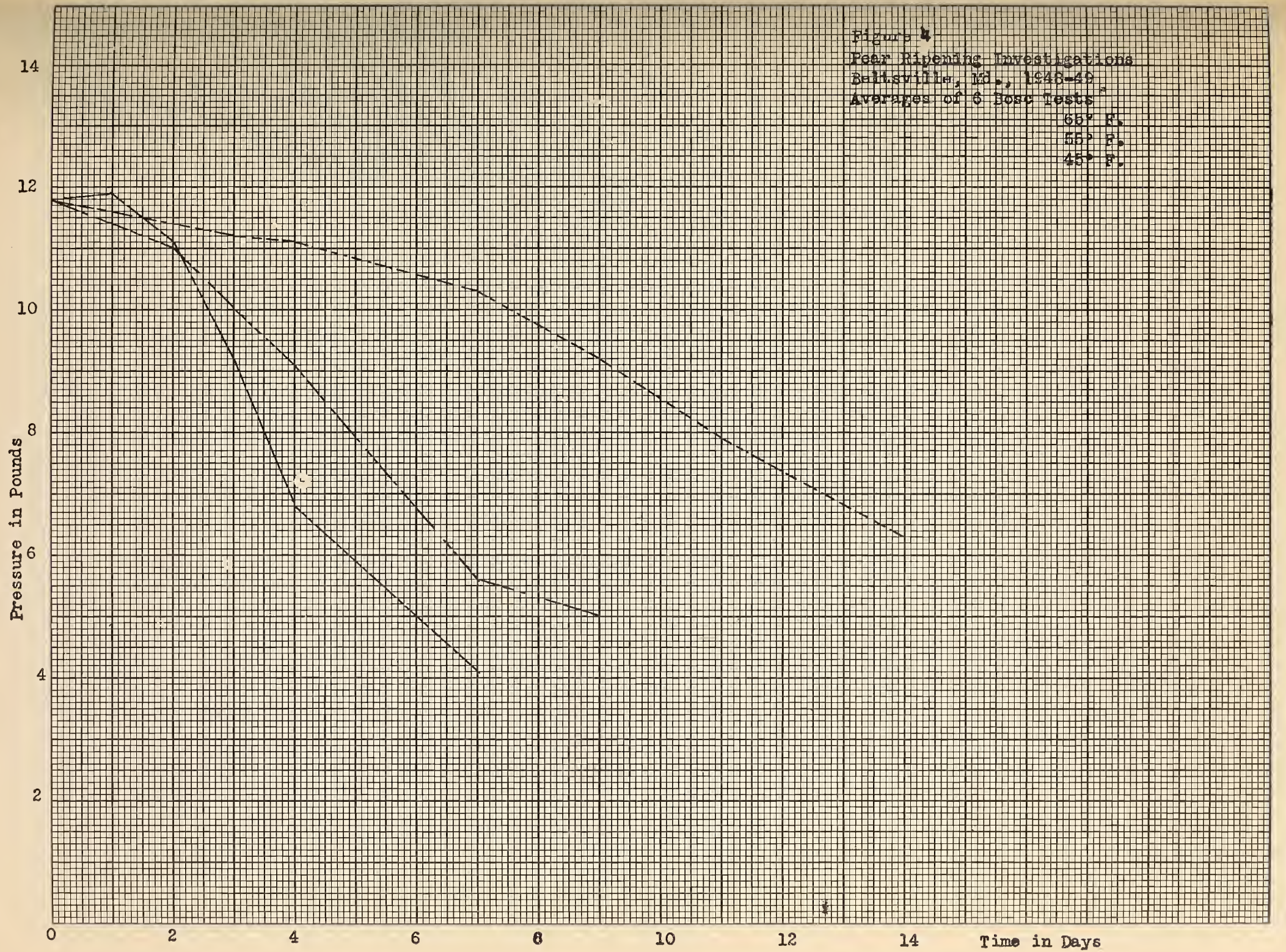
Figure 4
Pear Ripening Investigations
Beltsville, Md., 1948-49
Averages of 6 Bosc Tests
65° F.
55° F.
45° F.
Pressure in Pounds
14
12
10
8
6
4
2
0
2
4
6
8
10
12
14
Time in Days

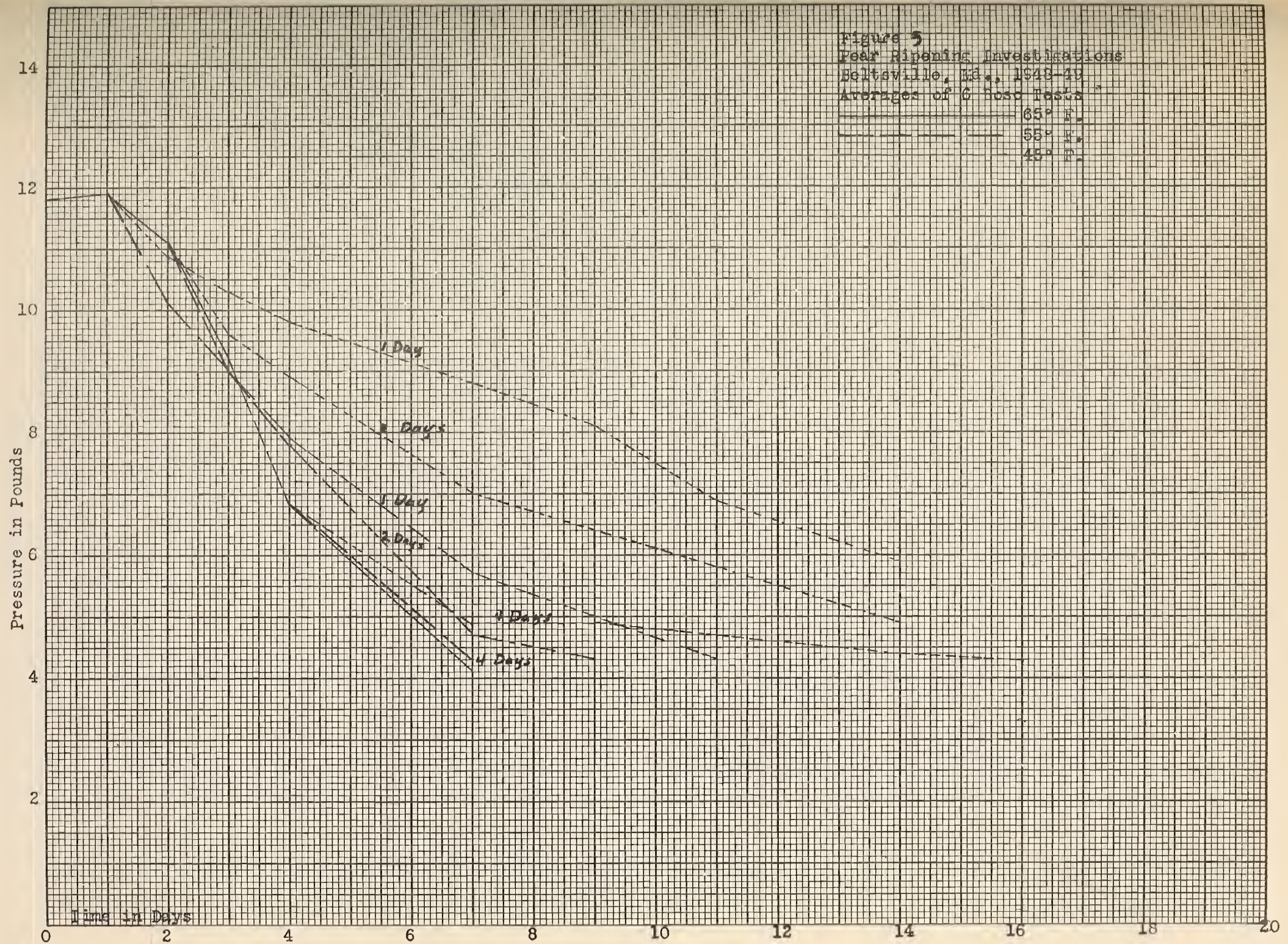
Figure 5
Pear Ripening Investigations
Beltsville, Md., 1948-49
Averages of 6 Rose Tests
65° F.
55° F.
45° F.
1 Day
2 Days
3 Days
4 Days
5 Days
6 Days
Pressure in Pounds
Time in Days
0
2
4
6
8
10
12
14
16
18
20
2
4
6
8
10
12
14

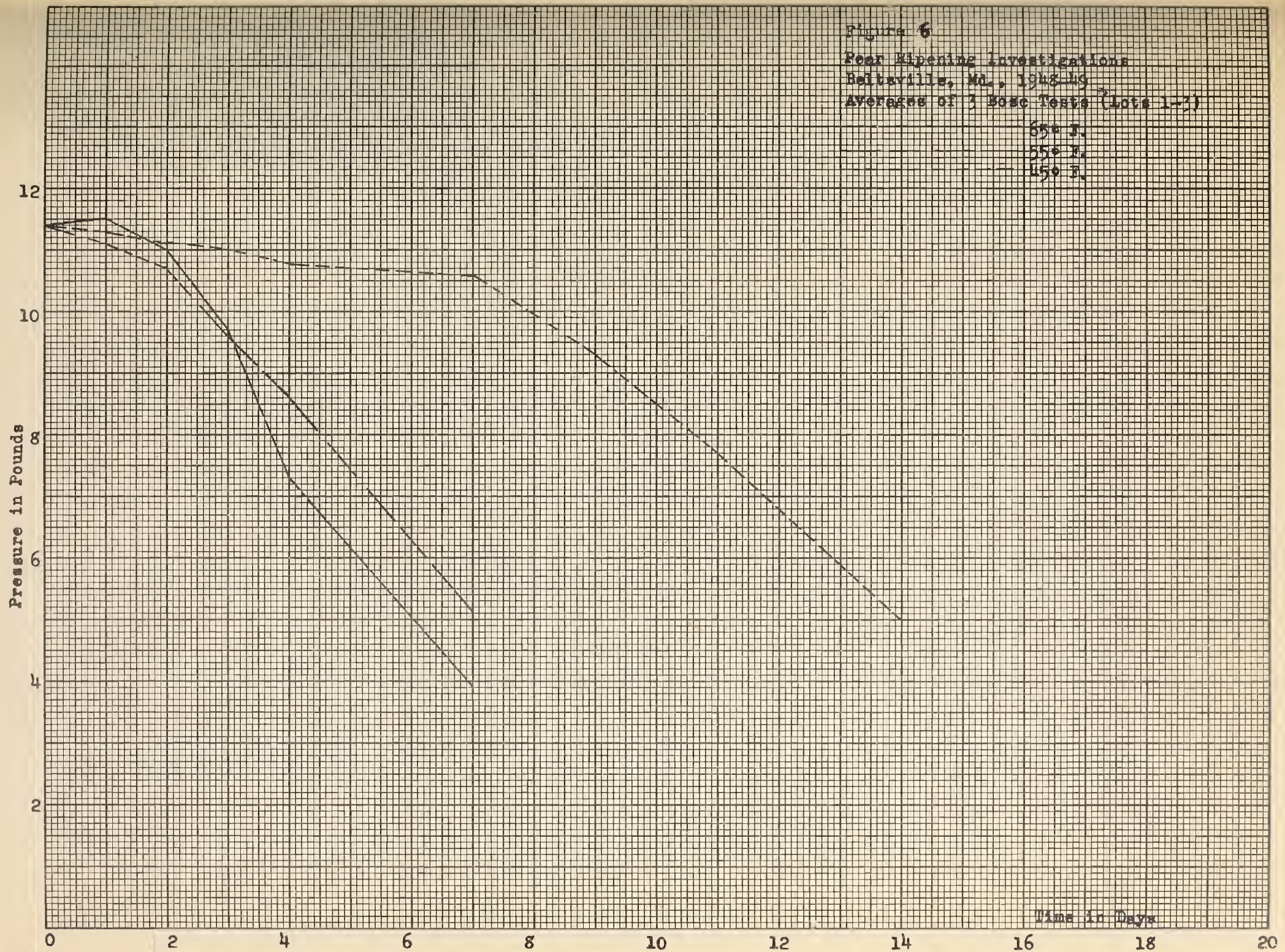
Figure 6
Pear Ripening Investigations
Beltsville, Md., 1948-49
Averages of 3 Bosc Tests (Lots 1-3)
65° F.
55° F.
45° F.
Pressure in Pounds
12
10
8
6
4
2
0
2
4
6
8
10
12
14
16
18
20
Time in Days

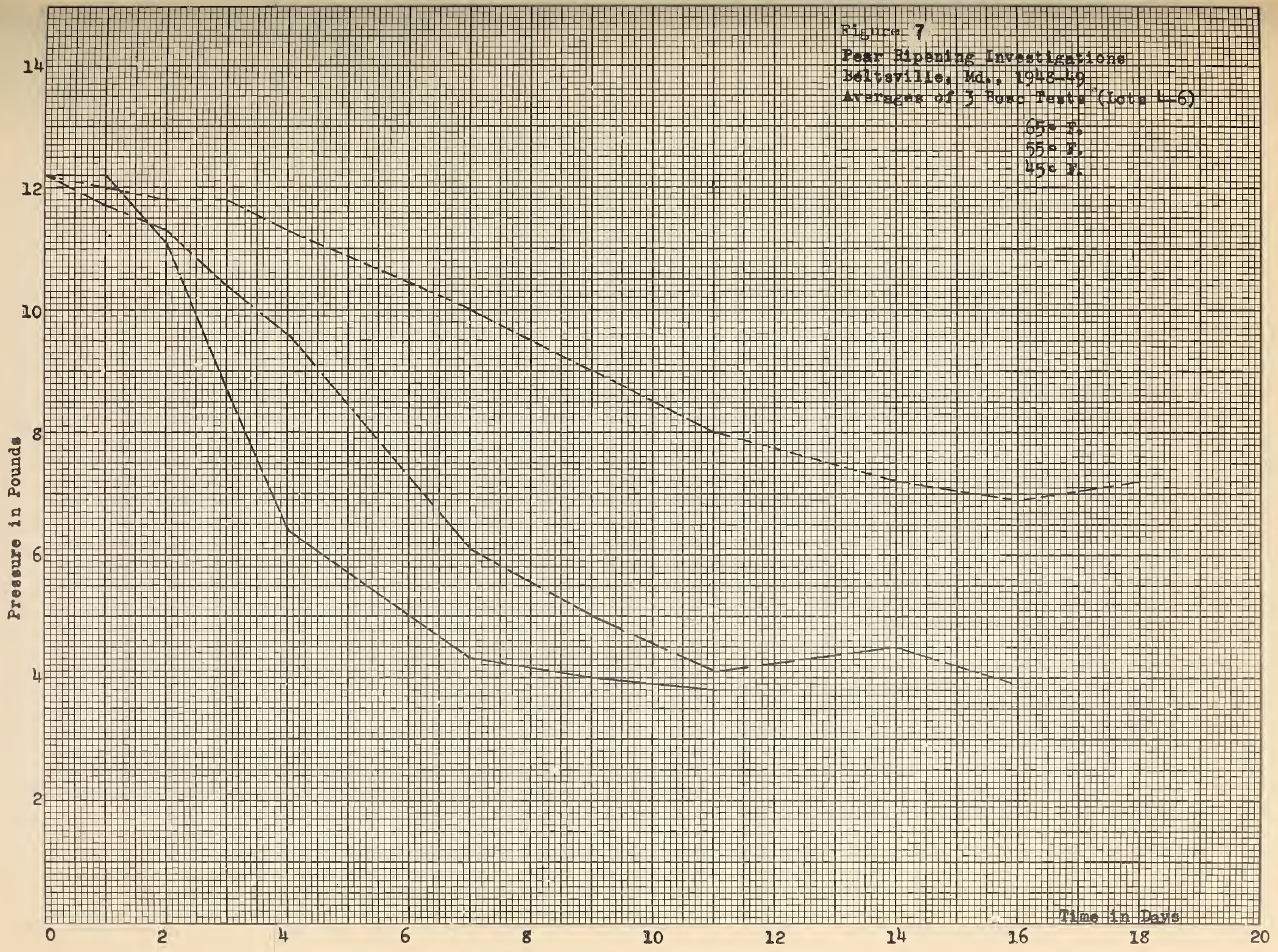
Figure 7
Pear Ripening Investigations
Beltsville, Md., 1948-49
Averages of 3 Runs Tests (Lots 4-6)
65° F.
55° F.
45° F.
Pressure in Pounds
14
12
10
8
6
4
2
Time in Days
0
2
4
6
8
10
12
14
16
18
20

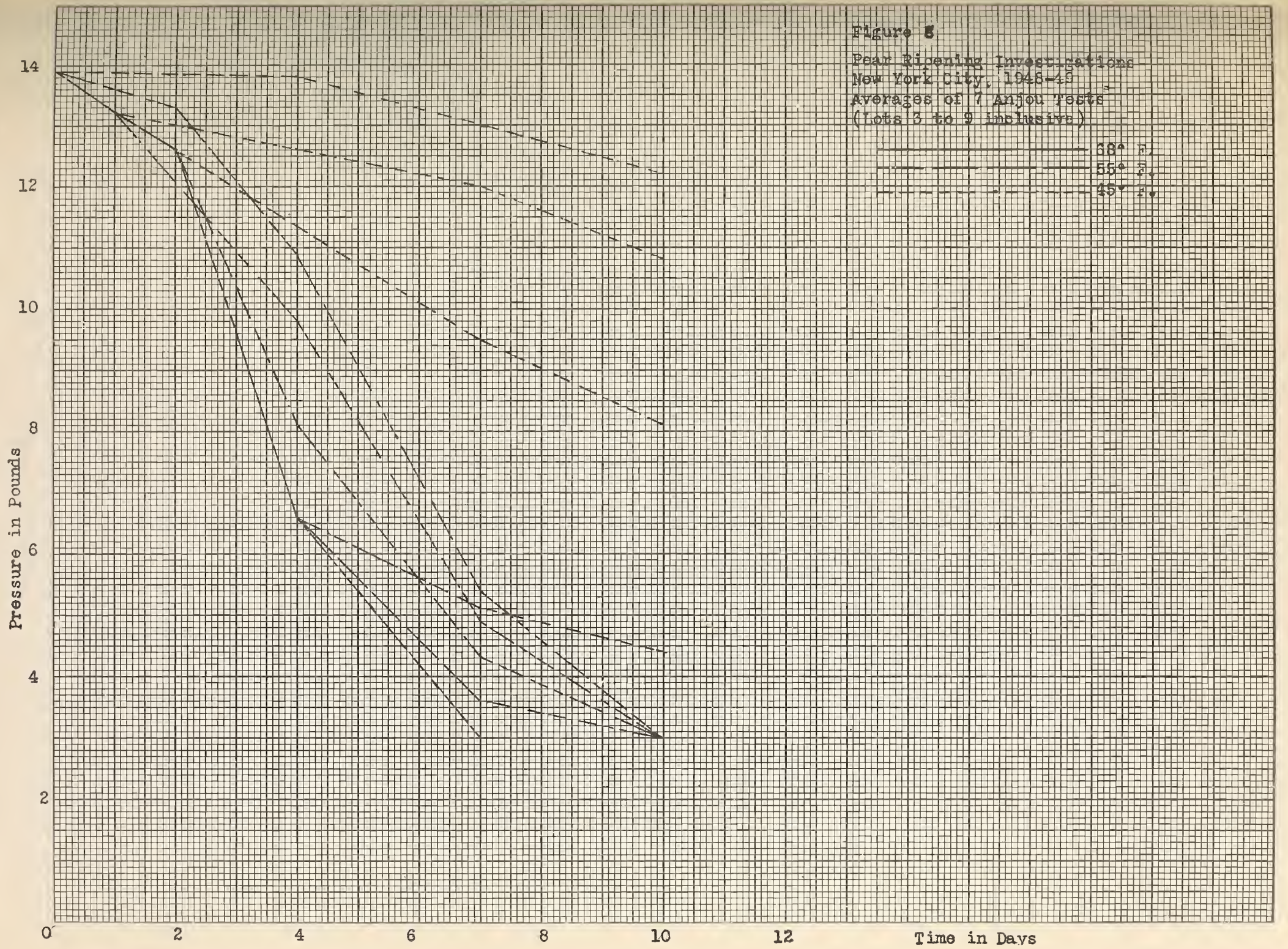
Figure 5
Pear Ripening Investigations
New York City, 1948-49
Averages of 7 Anjou Tests
(Lots 3 to 9 inclusive)
68° F.
55° F.
45° F.
Pressure in Pounds
14
12
10
8
6
4
2
0
2
4
6
8
10
12
Time in Days

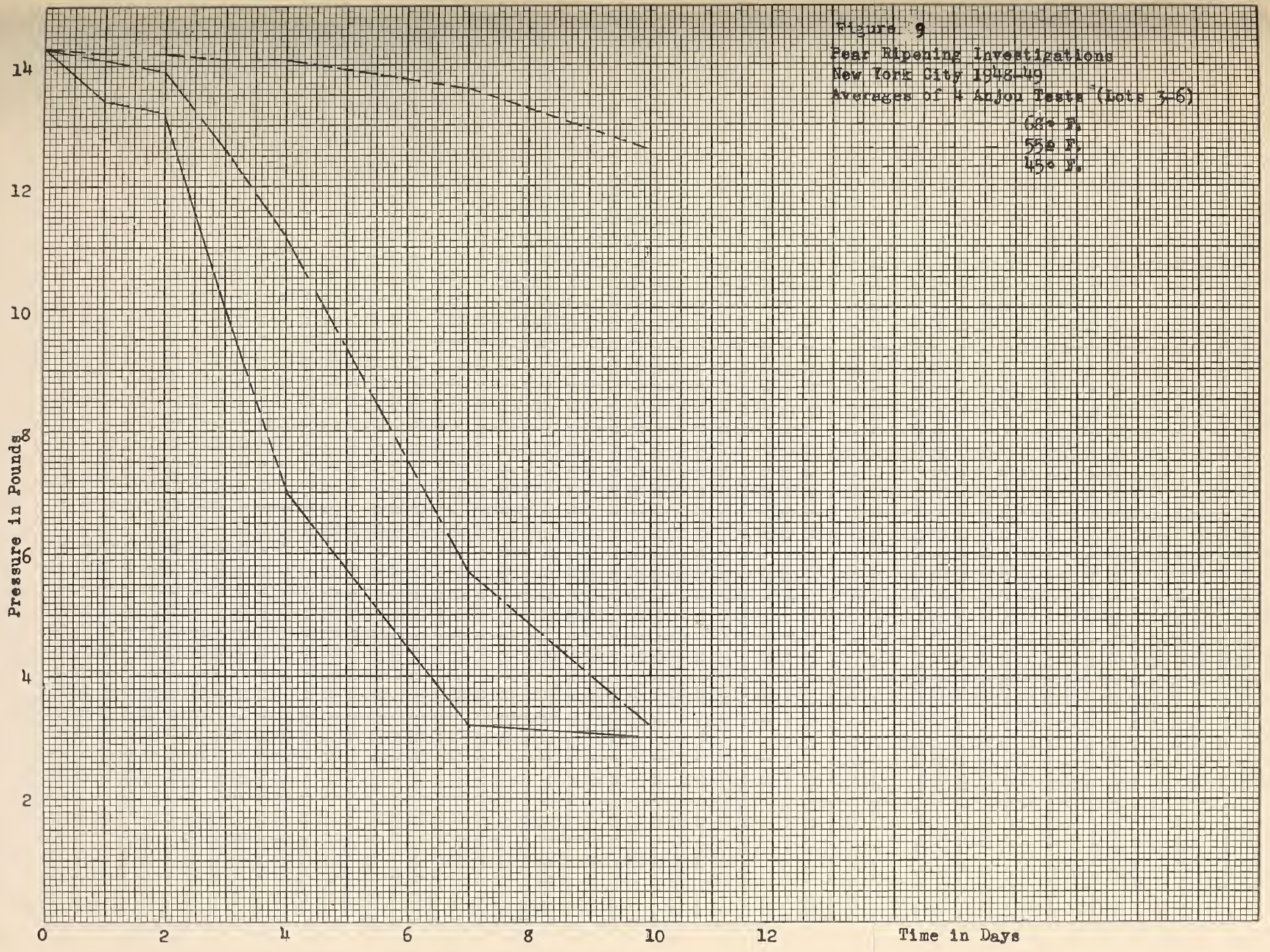
Figure 9
Pear Ripening Investigations
New York City 1948-49
Averages of 4 Anjou Tests (Lots 3-6)
68° F.
55° F.
45° F.
Pressure in Pounds
14
12
10
8
6
4
2
0
2
4
6
8
10
12
Time in Days

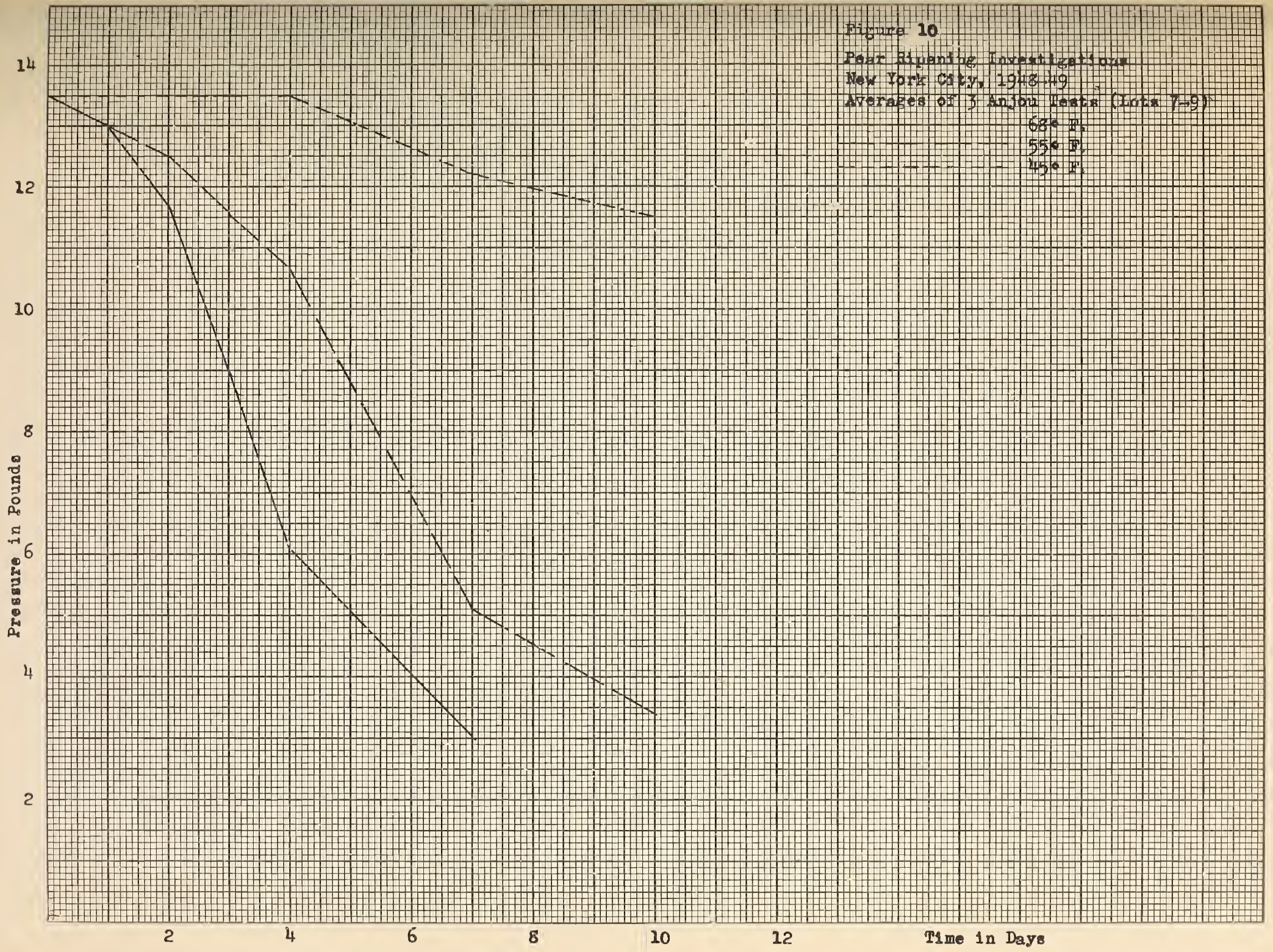
Figure 10
Pear Ripening Investigations
New York City, 1948-49
Averages of 3 Anjou Tests (Lots 7-9)
68° F.
55° F.
45° F.
Pressure in Pounds
14
12
10
8
6
4
2
2
4
6
8
10
12
Time in Days

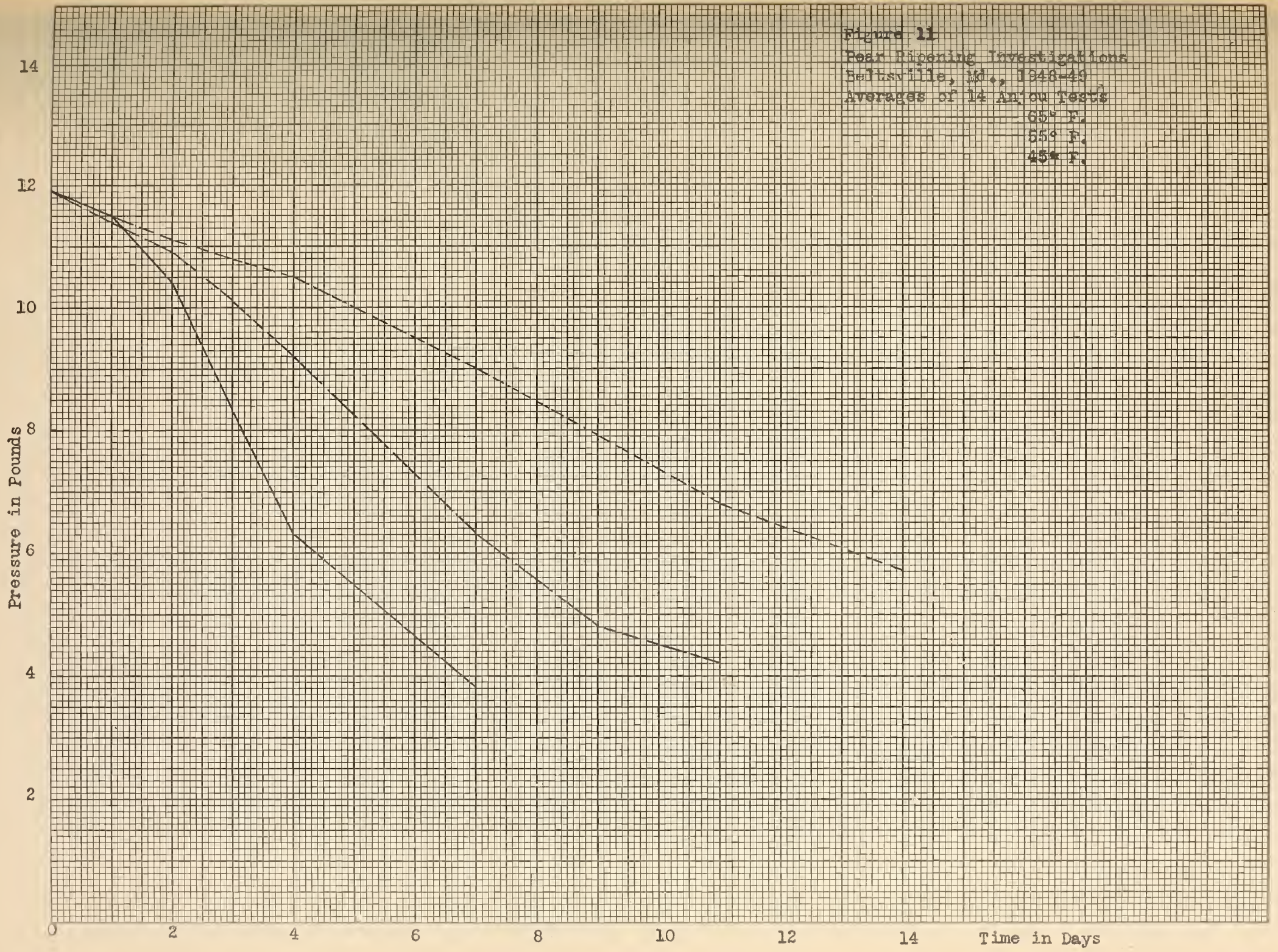
Figure 11
Pear Ripening Investigations
Beltsville, Md., 1948-49
Averages of 14 Anjou Tests
65° F.
55° F.
45° F.
Pressure in Pounds
14
12
10
8
6
4
2
0
2
4
6
8
10
12
14
Time in Days

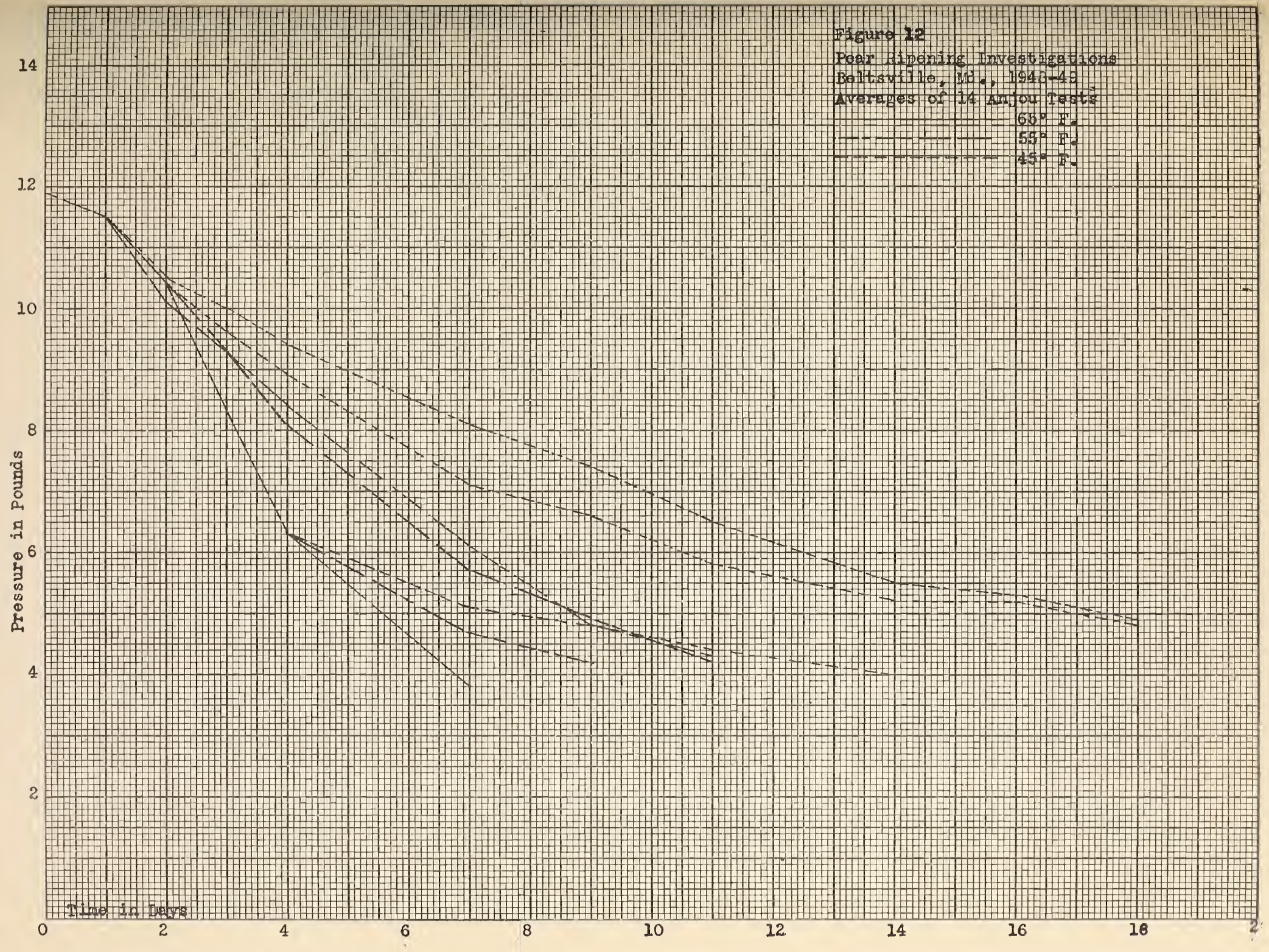
Figure 12
Pear Ripening Investigations
Beltsville, Md., 1948-49
Averages of 14 Anjou Tests
65° F.
55° F.
45° F.
Pressure in Pounds
14
12
10
8
6
4
2
Time in Days
0
2
4
6
8
10
12
14
16
18

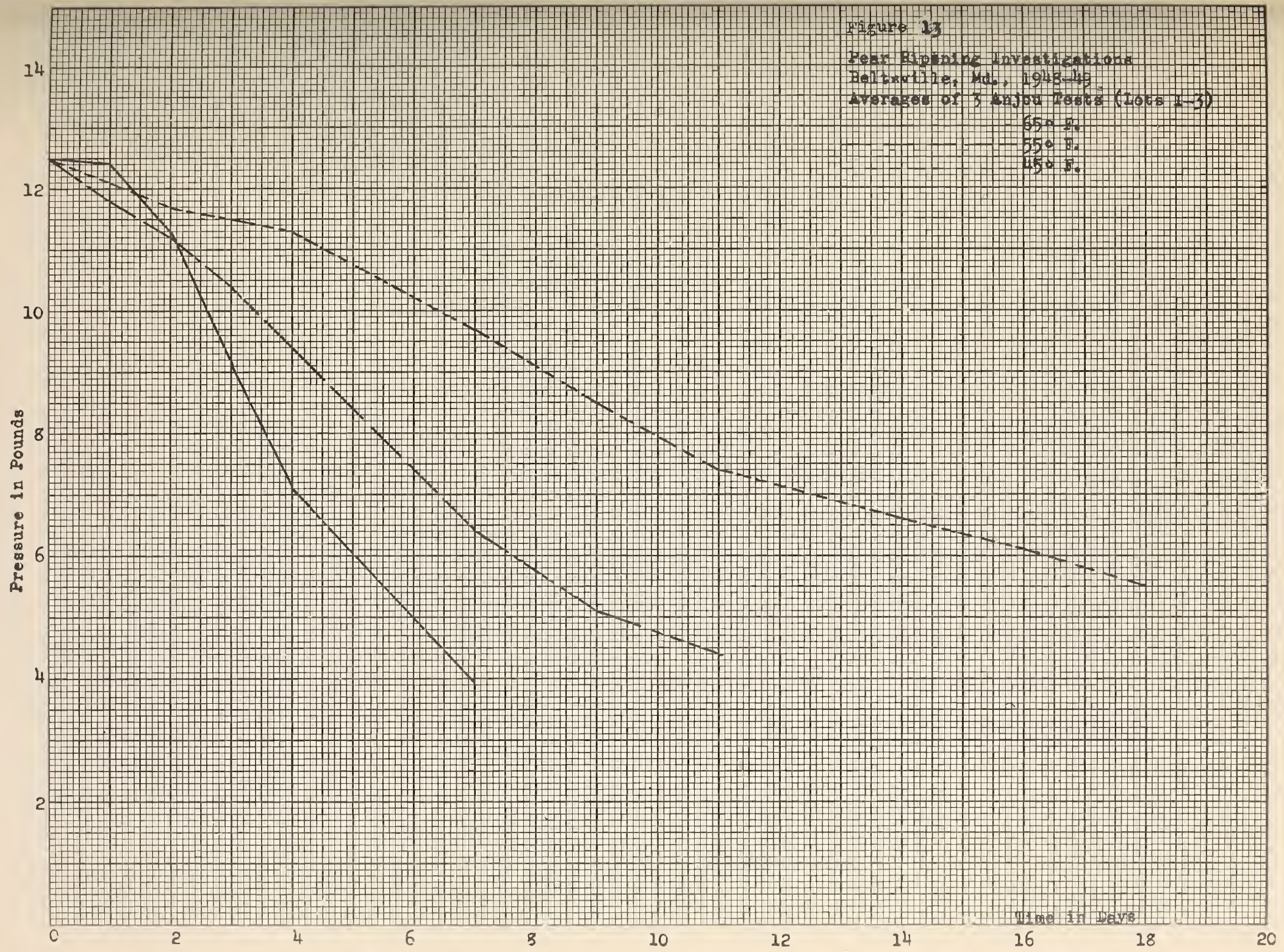
Figure 13
Pear Ripening Investigations
Beltsville, Md., 1948-49
Averages of 3 Anjou Tests (Lots 1-3)
65° F.
55° F.
45° F.
Pressure in Pounds
14
12
10
8
6
4
2
Time in Days
0
2
4
6
8
10
12
14
16
18
20

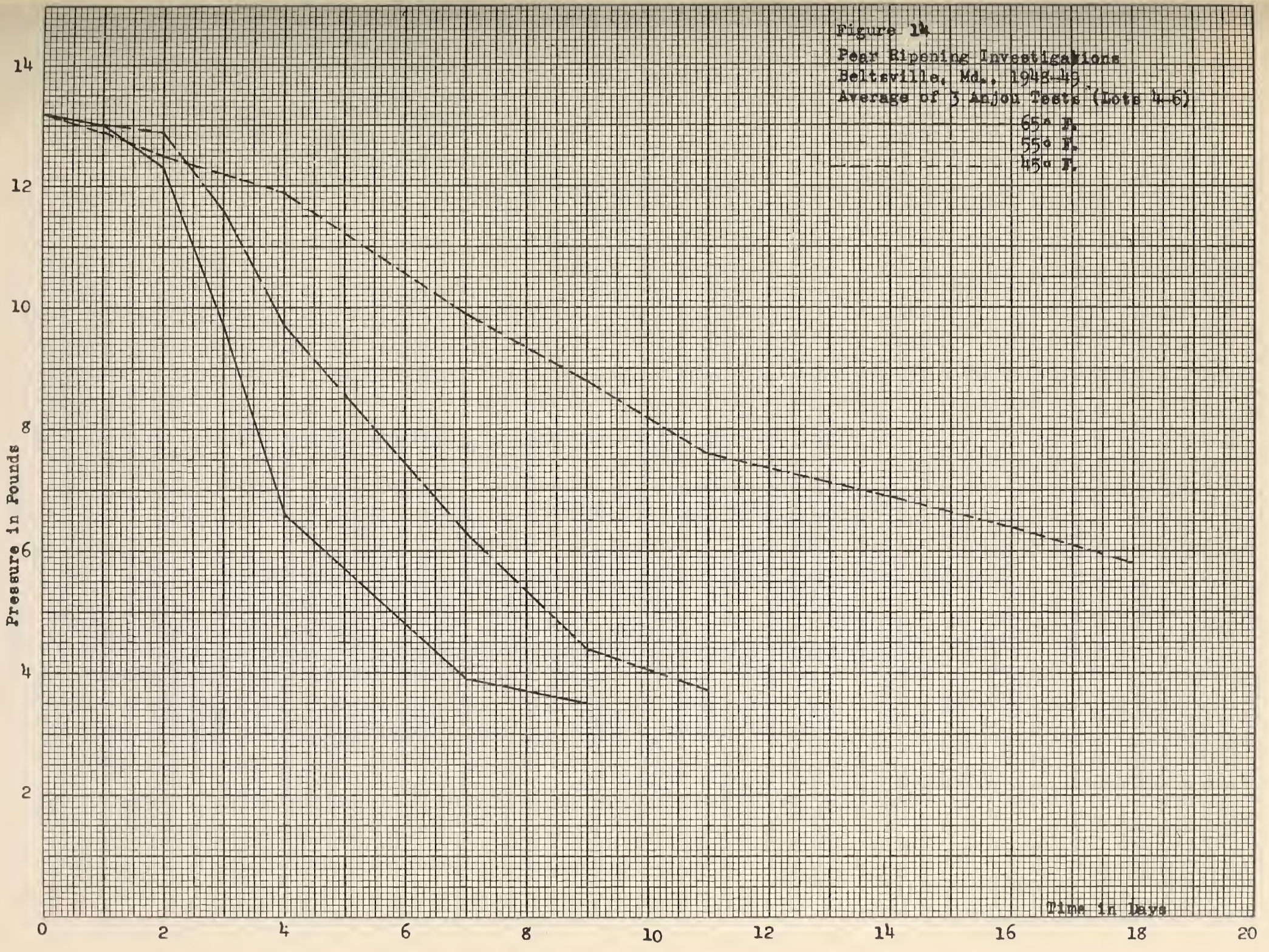
Figure 14
Pear Ripening Investigations
Beltsville, Md., 1948-49
Average of 3 Anjou Tests (Lots 4-6)
65° F.
55° F.
45° F.
Pressure in Pounds
Time in Days
0
2
4
6
8
10
12
14
16
18
20

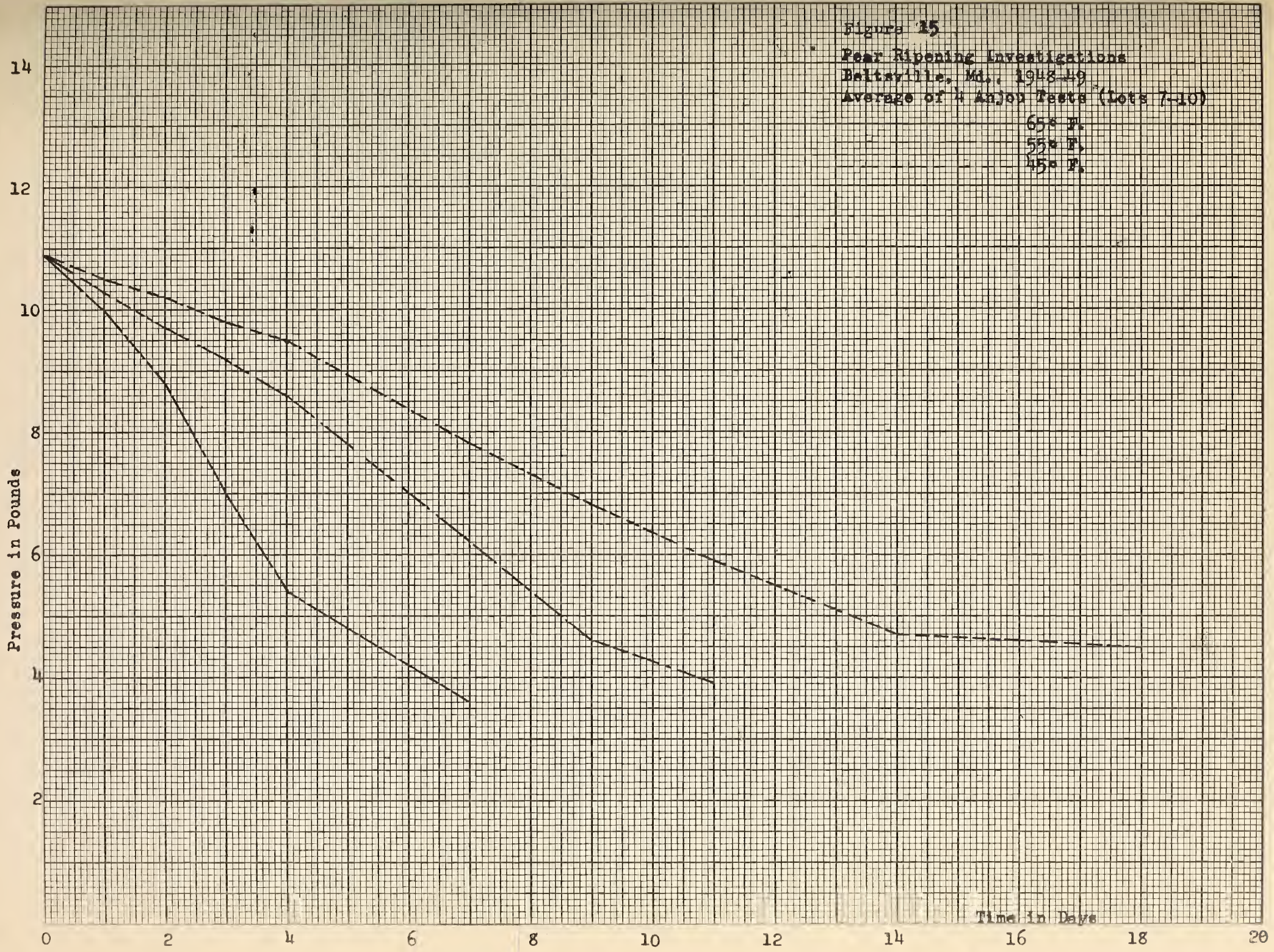
Figure 15
Pear Ripening Investigations
Beltsville, Md., 1948-49
Average of 4 Anjou Tests (Lots 7-10)
65° F.
55° F.
45° F.
Pressure in Pounds
14
12
10
8
6
4
2
Time in Days
0
2
4
6
8
10
12
14
16
18
20

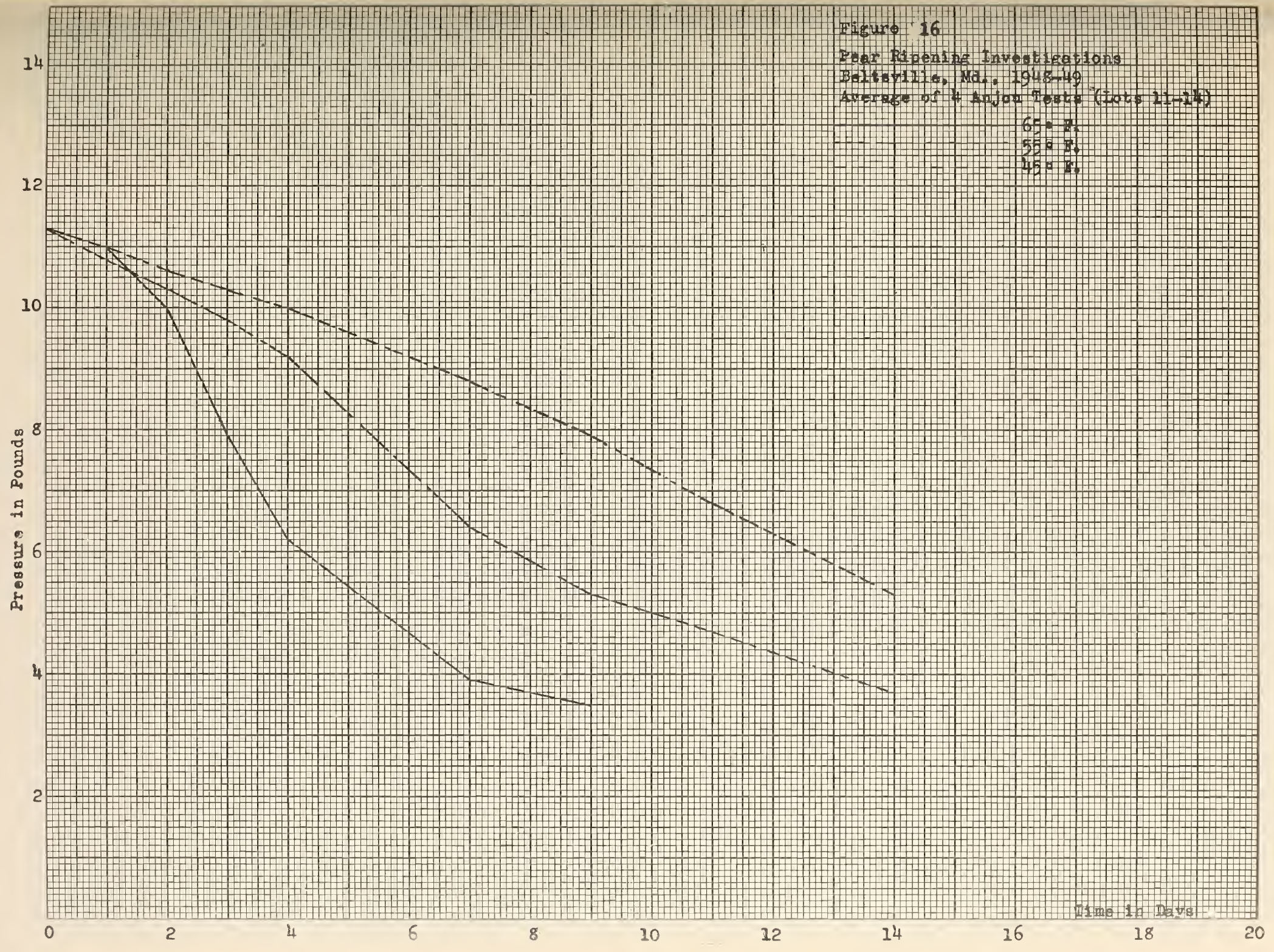
Figure 16
Pear Ripening Investigations
Beltsville, Md., 1948-49
Average of 4 Anjou Tests (lots 11-14)
65° F.
55° F.
45° F.
Pressure in Pounds
Time in Days
14
12
10
8
6
4
2
0
2
4
6
8
10
12
14
16
18
20

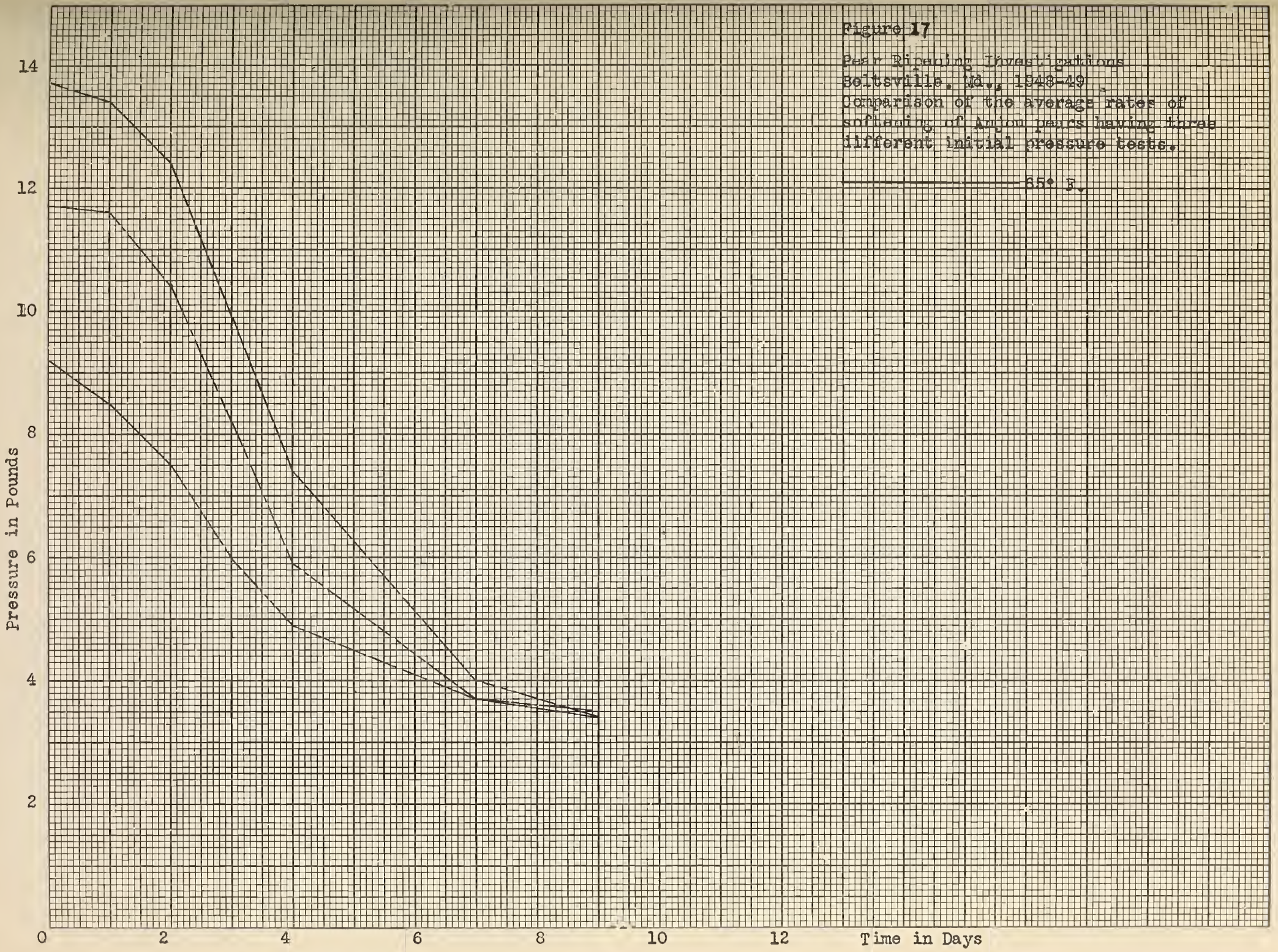
Figure 17
Pear Ripening Investigations
Beltsville, Md., 1948-49
Comparison of the average rates of softening of Anjou pears having three different initial pressure tests.
65° F.
Pressure in Pounds
14
12
10
8
6
4
2
0
2
4
6
8
10
12
Time in Days